CLAIMS

1. A fuel cell cathode comprising a catalyst layer that comprises a catalyst-supporting electrically conductive carrier and a polymer electrolyte, wherein a catalyst is additionally supported by or mixed with said catalyst-supporting electrically conductive carrier, said catalyst being in contact with an oxygen absorbing/releasing material.

2. The fuel cell cathode according to claim 1, wherein said oxygen absorbing/releasing material is comprised of one or more of an oxidation-number-variable metal, a metal oxide, or a compound thereof, which absorbs or releases oxygen based on the change in oxidation number.

3. The fuel cell cathode according to claim 1, wherein said oxygen absorbing/releasing material is comprised of one or more of Zr, Y, an alkali metal, an oxide of alkaline earth metal, or a compound thereof, which absorbs or releases oxygen based on the adsorption of oxygen.

4. The fuel cell cathode according to claim 3, wherein said oxygen absorbing/releasing material is comprised of one or more of CeO_2, CeO_2-ZrO_2, CeO_2-ZrO_2-Y_2O_3, or CeO_2-ZrO_2-rare-earth oxide.

5. The fuel cell cathode according to any one of claims 1 to 4, wherein the amount of said oxygen absorbing/releasing material in said catalyst layer is 5 to 16 wt.% relative to the total amount.

6. The fuel cell cathode according to any one of claims 1 to 5, wherein the total amount of the catalyst supported by said catalyst layer is 30 wt.% or less thereof.

7. The fuel cell cathode according to any one of claims 1 to 6, wherein the average particle size of said oxygen absorbing/releasing material is 2 to 40 nm.

8. The fuel cell cathode according to any one of claims 4 to 7, wherein said oxygen absorbing/releasing material is comprised of one or more of CeO_2, CeO_2-ZrO_2, CeO_2-ZrO_2-Y_2O_3, CeO_2-ZrO_2-rare-earth oxide, of which CeO_2 has been partly reduced to Ce_2O_3 .

9. The fuel cell cathode according to any one of claims 1 to 8, wherein the ratio of the amount of said polymer electrolyte to the amount of said carrier in said catalyst layer is 0.8 to 1 or less.

10. The fuel cell cathode according to any one of claims 1 to 9, wherein said carrier is comprised of carbon that has been treated to be hydrophobic.

11. The fuel cell cathode according to any one of claims 1 to 10, wherein the pore volume of said catalyst layer is increased by treating a catalyst ink, of which said catalyst layer is made, such that the number of pores therein is increased.

12. The fuel cell cathode according to any one of claims 1 to 11, wherein more of said oxygen absorbing/releasing material is contained towards the electrolyte membrane side in said catalyst layer than towards the diffusion layer side, and wherein less of said oxygen absorbing/releasing material is contained towards the diffusion layer side than towards the electrolyte membrane side, or none at all is contained in such location.

13. A polymer electrolyte fuel cell comprising an anode, a cathode, and a polymer electrolyte membrane disposed between said anode and said cathode, said cathode comprising the fuel cell cathode according to any one of claims 1 to 12.

14. A method of operating a polymer electrolyte fuel cell comprising an anode, a cathode, and a polymer electrolyte membrane disposed between said anode and said cathode, wherein said cathode comprises the fuel cell cathode according to any one of claims 4 to 12, said method comprising feeding hydrogen gas to said oxygen absorbing/releasing material, which is comprised of one or more of CeO_2, CeO_2-ZrO_2, CeO_2-ZrO_2-Y_2O_3, or CeO_2-ZrO_2-rare-earth oxide, periodically in a pulsed manner before or during operation so as to treat CeO_2 to be partly reduced to CeO_3.